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GNRO-2008/00008

March 10, 2008

U.S. Nuclear Regulatory Commission

Attn: Document Control Desk
Washington, DC 20555-0001

Subject: LER 2008-001-00- Manual Reactor SCRAM Due to Loss of Main Electrical
Output Transformer Cooling

Grand Gulf Nuclear Station, Unit 1
Docket No. 50-416
License No. NPF-29

Dear Sir or Madam:

Attached is Licensee Event Report (LER) 2008-001-00 which is a final report.

This letter does not contain any commitments.

Yours truly,

A handwritten signature in black ink, appearing to read "Michael J. Larson", followed by a horizontal line.

Michael J. Larson
Acting-Manager, Licensing

MJL

attachment: LER 2008-001-00
cc: (See Next Page)

GNRO-2008/00008

March 10, 2008

cc: NRC Senior Resident Inspector
Grand Gulf Nuclear Station
Port Gibson, MS 39150

U. S. Nuclear Regulatory Commission
ATTN: Mr. Elmo E. Collins (w/a)
Regional Administrator, Region IV
611 Ryan Plaza Drive, Suite 400
Arlington, TX 76011-4005

U. S. Nuclear Regulatory Commission
ATTN: Mr. Jack Donohew, NRR/DORL (w/2)
ATTN: ADDRESSEE ONLY
ATTN: U. S. Postal Delivery Address Only
Mail Stop OWFN/8 G14
Washington, DC 20555-0001

NRC FORM 366 (9-2007)		U.S. NUCLEAR REGULATORY COMMISSION		APPROVED BY OMB: NO. 3150-0104		EXPIRES: 08/31/2010																																									
<h2 style="margin: 0;">LICENSEE EVENT REPORT (LER)</h2> <p style="margin: 5px 0;">(See reverse for required number of digits/characters for each block)</p>																																															
1. FACILITY NAME Grand Gulf Nuclear Station, Unit 1				2. DOCKET NUMBER 05000 416		3. PAGE 1 OF 4																																									
4. TITLE Manual Reactor SCRAM Due to Loss of Main Electrical Output Transformer Cooling																																															
5. EVENT DATE			6. LER NUMBER			7. REPORT DATE			8. OTHER FACILITIES INVOLVED																																						
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO.	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER																																					
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9. OPERATING MODE <div style="text-align: center; font-size: 1.5em;">1</div>			11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR§: <i>(Check all that apply)</i>																																												
10. POWER LEVEL <div style="text-align: center; font-size: 1.5em;">099</div>			<table style="width:100%; border: none;"> <tr> <td><input type="checkbox"/> 20.2201(b)</td> <td><input type="checkbox"/> 20.2203(a)(3)(i)</td> <td><input type="checkbox"/> 50.73(a)(2)(i)(C)</td> <td><input type="checkbox"/> 50.73(a)(2)(vii)</td> </tr> <tr> <td><input type="checkbox"/> 20.2201(d)</td> <td><input type="checkbox"/> 20.2203(a)(3)(ii)</td> <td><input type="checkbox"/> 50.73(a)(2)(ii)(A)</td> <td><input type="checkbox"/> 50.73(a)(2)(viii)(A)</td> </tr> <tr> <td><input type="checkbox"/> 20.2203(a)(1)</td> <td><input type="checkbox"/> 20.2203(a)(4)</td> <td><input type="checkbox"/> 50.73(a)(2)(ii)(B)</td> <td><input type="checkbox"/> 50.73(a)(2)(viii)(B)</td> </tr> <tr> <td><input type="checkbox"/> 20.2203(a)(2)(i)</td> <td><input type="checkbox"/> 50.36(c)(1)(i)(A)</td> <td><input type="checkbox"/> 50.73(a)(2)(iii)</td> <td><input type="checkbox"/> 50.73(a)(2)(ix)(A)</td> </tr> <tr> <td><input type="checkbox"/> 20.2203(a)(2)(ii)</td> <td><input type="checkbox"/> 50.36(c)(1)(ii)(A)</td> <td><input checked="" type="checkbox"/> 50.73(a)(2)(iv)(A)</td> <td><input type="checkbox"/> 50.73(a)(2)(x)</td> </tr> <tr> <td><input type="checkbox"/> 20.2203(a)(2)(iii)</td> <td><input type="checkbox"/> 50.36(c)(2)</td> <td><input type="checkbox"/> 50.73(a)(2)(v)(A)</td> <td><input type="checkbox"/> 73.71(a)(4)</td> </tr> <tr> <td><input type="checkbox"/> 20.2203(a)(2)(iv)</td> <td><input type="checkbox"/> 50.46(a)(3)(ii)</td> <td><input type="checkbox"/> 50.73(a)(2)(v)(B)</td> <td><input type="checkbox"/> 73.71(a)(5)</td> </tr> <tr> <td><input type="checkbox"/> 20.2203(a)(2)(v)</td> <td><input type="checkbox"/> 50.73(a)(2)(i)(A)</td> <td><input type="checkbox"/> 50.73(a)(2)(v)(C)</td> <td><input type="checkbox"/> OTHER</td> </tr> <tr> <td><input type="checkbox"/> 20.2203(a)(2)(vi)</td> <td><input type="checkbox"/> 50.73(a)(2)(i)(B)</td> <td><input type="checkbox"/> 50.73(a)(2)(v)(D)</td> <td style="text-align: right; font-size: 0.8em;">Specify in Abstract below or in NRC Form 366A</td> </tr> </table>									<input type="checkbox"/> 20.2201(b)	<input type="checkbox"/> 20.2203(a)(3)(i)	<input type="checkbox"/> 50.73(a)(2)(i)(C)	<input type="checkbox"/> 50.73(a)(2)(vii)	<input type="checkbox"/> 20.2201(d)	<input type="checkbox"/> 20.2203(a)(3)(ii)	<input type="checkbox"/> 50.73(a)(2)(ii)(A)	<input type="checkbox"/> 50.73(a)(2)(viii)(A)	<input type="checkbox"/> 20.2203(a)(1)	<input type="checkbox"/> 20.2203(a)(4)	<input type="checkbox"/> 50.73(a)(2)(ii)(B)	<input type="checkbox"/> 50.73(a)(2)(viii)(B)	<input type="checkbox"/> 20.2203(a)(2)(i)	<input type="checkbox"/> 50.36(c)(1)(i)(A)	<input type="checkbox"/> 50.73(a)(2)(iii)	<input type="checkbox"/> 50.73(a)(2)(ix)(A)	<input type="checkbox"/> 20.2203(a)(2)(ii)	<input type="checkbox"/> 50.36(c)(1)(ii)(A)	<input checked="" type="checkbox"/> 50.73(a)(2)(iv)(A)	<input type="checkbox"/> 50.73(a)(2)(x)	<input type="checkbox"/> 20.2203(a)(2)(iii)	<input type="checkbox"/> 50.36(c)(2)	<input type="checkbox"/> 50.73(a)(2)(v)(A)	<input type="checkbox"/> 73.71(a)(4)	<input type="checkbox"/> 20.2203(a)(2)(iv)	<input type="checkbox"/> 50.46(a)(3)(ii)	<input type="checkbox"/> 50.73(a)(2)(v)(B)	<input type="checkbox"/> 73.71(a)(5)	<input type="checkbox"/> 20.2203(a)(2)(v)	<input type="checkbox"/> 50.73(a)(2)(i)(A)	<input type="checkbox"/> 50.73(a)(2)(v)(C)	<input type="checkbox"/> OTHER	<input type="checkbox"/> 20.2203(a)(2)(vi)	<input type="checkbox"/> 50.73(a)(2)(i)(B)	<input type="checkbox"/> 50.73(a)(2)(v)(D)	Specify in Abstract below or in NRC Form 366A
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FACILITY NAME Grand Gulf Nuclear Station - Michael J. Larson, Licensing Engineer									TELEPHONE NUMBER (Include Area Code) 601-437-6685																																						
13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT																																															
CAUSE	SYSTEM	COMPONENT	MANU- FACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANU- FACTURER	REPORTABLE TO EPIX																																						
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14. SUPPLEMENTAL REPORT EXPECTED <input type="checkbox"/> YES (If yes, complete 15. EXPECTED SUBMISSION DATE) <input checked="" type="checkbox"/> NO						15. EXPECTED SUBMISSION DATE			MONTH	DAY	YEAR																																				
ABSTRACT <i>(Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines)</i> <p style="margin-top: 20px;">On January 12, 2008, at 1626 hours a manual reactor scram was initiated from 99 percent power due to loss of cooling to the Main Transformers. After the scram reactor water level decreased to Level 2 (-41.6 inches) and Reactor Core Isolation Cooling initiated. There were no inoperable structures, systems, or components at the start of the event that contributed to the event. The normal heat sink (main condenser) remained available and no Main Steam Safety Relief Valves actuations occurred during the event. All control rods fully inserted and all safety systems functioned as designed and responded properly.</p> <p style="margin-top: 20px;">The cause of this event was the loss of cooling to the Main Transformers caused by loss of Auxiliary Power to the Main Transformer cooling system. Inspection of the complete circuit for Main Transformer Auxiliary Power showed that the "B" phase power cables were found to be burned in two at the transfer switch panel. The cause of the "B" phase power cable failure is attributed to failure of an electrical compression connection on a lug connection. This particular cable and connection has been in service since plant start-up. Potential root causes were determined to be use of a compression connection for high current applications versus the preferred crimp type connection and an inadequate preventive maintenance strategy to provide early detection. Corrective actions included an inspection of the power panel and replacement of all damaged cabling.</p>																																															

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LICENSEE EVENT REPORT (LER)				
1. FACILITY NAME	2. DOCKET	6. LER NUMBER		3. PAGE
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A. REPORTABLE OCCURRENCE

On January 12, 2008, at 1626 hours Grand Gulf Nuclear Station initiated a manual reactor scram from 99 percent power due loss of cooling to the Main Transformers [EL XFMR]. After the scram reactor water level decreased to Level 2 (-41.6 inches) and Reactor Core Isolation Cooling (RCIC) initiated. The following occurrences were considered reportable:

- Manual Actuation of Reactor Protection System (RPS) [JC] Manual Scram (Reference: 10CFR50.73(a)(2)(iv) (A) & (B)(1))
- Reactor Core Isolation Cooling (RCIC) [BN] automatic initiation and injection on Reactor Vessel Water Level – Low Low, Level 2 into the reactor. (Reference: 10CFR50.73(a)(2)(iv) (A) & (B)(5))

Notification was made to the NRC's Emergency Notification System (ENS) reporting this condition pursuant to 10CFR50.72(b)(2)(iv)(B) and 10CFR50.72(b)(3)(iv)(A) and this event is reported under 50.73(a)(2)(iv)(A) – "Any event or condition that resulted in manual or automatic actuation of any of the systems listed in paragraph (a)(2)(iv)(B) of this section...."

B. INITIAL CONDITIONS

At the time of the event, the reactor was in OPERATIONAL MODE 1 with reactor power at approximately 99 percent. There were no additional inoperable structures, systems, or components at the start of the event that contributed to the event.

C. DESCRIPTION OF OCCURRENCE

On January 12, 2008, at 1558, Main Transformer trouble alarms were received for all three in-service transformers. Investigation revealed a malfunction had occurred on the "B" phase Auxiliary Power Supply (panel 1SMT1) to the Main Transformer Auxiliaries. Operations and Electrical personnel were dispatched to the transformers. The "A" Transformer was found with no cooler groups running. The "B" and "C" Transformers were found with only partial cooler groups running. Subsequently, all cooling groups stopped for the "B" and "C" Transformers. Further investigation in the field indicated that power to the transformer cooling systems could not be restored.

Because there was a loss of cooling to the Main Transformers, a manual SCRAM was initiated at 1626 followed by a Main Turbine trip at 1627. After the scram reactor level decreased due to shrinkage to Level 2 (-41.6 inches) and Reactor Core Isolation Cooling initiated. Operators manually tripped Reactor Feed Pump Turbine (RFPT) "B". Reactor Pressure Vessel (RPV) water level increased to a maximum of +60 inches resulting in a RCIC shutdown on Level 8 (+53.5 inches) and a RFPT "A" trip on Level 9 (+56 inches). Operations returned RFPT "A" to startup level control and placed RCIC in the normal standby lineup. The scram was reset at 1636. The normal heat sink (main condenser) remained available and no Main Steam Safety Relief Valves (MSRV) actuations occurred during the event. All control rods fully inserted and all safety systems functioned as designed and responded properly. This was NOT a SCRAM with complications.

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D. CAUSE of OCCURRENCE

The cause of this event was the loss of cooling to the Main Transformers caused by loss of Auxiliary power to the Main Transformer cooling system. Inspection of the complete circuit for Main Transformer Auxiliary Power showed that the "B" phase power cables were found to be burned in two in panel 1SMT1 (transfer switch panel). The cause of the "B" phase power cable failure is attributed to failure of an electrical compression connection on a lug connection; the connection was manufactured by BURNDY®, Model No. D1281. The root cause of the power cable failure could not be conclusively determined by the initial investigation. This particular cable and connection has been inservice since plant start-up. One potential root cause was determined to be use of a compression connection for high current applications versus the preferred crimp type connection. Another potential root cause was there was an inadequate preventive maintenance strategy to provide early detection. Figure 1 provides a picture of the failed connection.

E. CORRECTIVE ACTIONS

Immediate Corrective Actions – Completed inspection of the 1SMT1 Transfer Switch Panel. All damaged cabling has been replaced. Inspection results indicate that no damage occurred to the affected transformers and all equipment responses were as designed and expected.

Long Term Corrective Actions - Condition Report GGN-2008-00174 was written and will address any additional actions.

F. SAFETY ASSESSMENT

Immediate actions performed by the Operations staff were adequate and appropriate in placing and maintaining the reactor in safe shutdown condition. No margin of safety was affected or encroached. All safety systems responded as designed in this event.

Reactor Core Isolation Cooling initiated at Level 2 (-41.6 inches). No Emergency Core Cooling System (ECCS) initiations occurred. The Group 2 and 3 Primary Containment Isolation initiated at Level 3 (+11.4 inches), however no valves changed position because these valves were already in the normal isolated position. The Group 2 and 3 isolations were for valves in the same system.

This condition did not prevent the fulfillment of a safety function therefore there were no safety system functional failures. Based on the discussion provided, the health and safety of the public was not compromised by this event.

G. ADDITIONAL INFORMATION

Previous Similar Events - Pursuant to 10CFR50.73(b)(5) this issue is considered an infrequent event. There has not been any occurrence of the same underlying concern in the past two years at Grand Gulf Nuclear Station.

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Figure 1 – As Found Condition

